



Swiss Science Concentrates

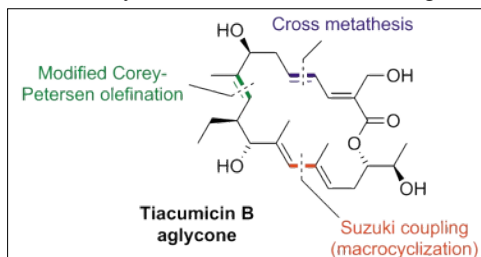
A CHIMIA Column

Short Abstracts of Interesting Recent Publications of Swiss Origin

Total Synthesis of the Tiacumicin B (Lipiarmycin A3/ Fidaxomicin) Aglycone

F. Glaus and K.-H. Altmann*, *Angew. Chem. Int. Ed.* **2015**, *54*, 1937. ETH Zürich

The macrolide antibiotic tiacumicin B (lipiarmycin A3, fidaxomicin) is used for the treatment of *Clostridium difficile* infections. It is also a potent inhibitor of *Mycobacterium tuberculosis*, but limited oral bioavailability renders it unsuitable for systemic therapy. Glaus and Altmann have developed an efficient approach to the synthesis of the tiacumicin B aglycone. Key steps in the synthesis of the macrocyclization precursor were a highly selective, one-pot Corey–Peterson olefination and an ene–diene cross-metathesis reaction. Depending on the reaction conditions, the final deprotection delivered either the fully deprotected tiacumicin B aglycone or partially protected versions thereof. Synthetic access to the target compound provides

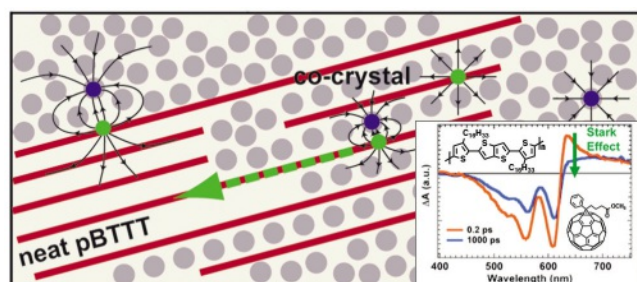


a basis for structure–activity studies and may eventually lead to variants with improved therapeutic properties.

A Close Look at Charge Generation in Polymer: Fullerene Blends with Microstructure Control

M. Scarongella, J. De Jonghe-Risse, E. Buchaca-Domingo, M. Causa', Z. Fei, M. Heeney, J.-E. Moser, N. Stingelin, and N. Banerji*, *J. Am. Chem. Soc.* **2015**, *137*, 2908. University of Fribourg and EPF Lausanne

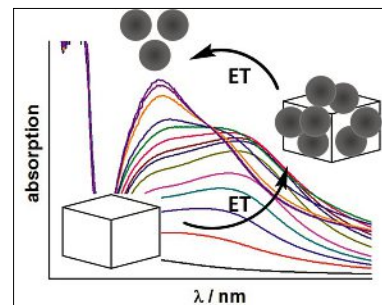
The photoactive material of organic photovoltaic (OPV) cells commonly consists of a conjugated polymer electron donor blended with an electron accepting fullerene derivative. Banerji and collaborators reveal some of the key mechanisms during charge generation in polymer:fullerene blends. Using ultrafast transient absorption, electroabsorption (Stark effect), and fluorescence up-conversion spectroscopy, the migration of holes from intermixed co-crystal regions to neat polymer domains on the sub-picosecond time scale was visualized. This ultrafast transport is likely sustained by high local mobility and by an energy cascade driving the holes toward the neat domains.



Electron Transfer in Peptides: On the Formation of Silver Nanoparticles

S. Kracht, M. Messerer, M. Lang, S. Eckhardt, M. Lauz, B. Grobety, K. M. Fromm*, and B. Giese*, *Angew. Chem. Int. Ed.* **2015**, *10*, 2912. University of Fribourg

Some microorganisms perform anaerobic mineral respiration by reducing metal ions to metal nanoparticles, using peptide aggregates as medium for electron transfer (ET). Fromm, Giese and their coworkers investigated such a reaction type using model peptides and silver as the metal. Surprisingly, Ag⁺ ions bound by peptides with histidine as the Ag⁺-binding amino acid and tyrosine as photoinducible electron donor cannot be reduced to Ag nanoparticles (AgNPs) under ET conditions. Chloride ions, however, which are ubiquitous in biological systems, can facilitate the ET induced synthesis of AgNPs from Ag⁺-peptides by assembling silver ions into AgCl microcrystals.



miR-CLIP Capture of a miRNA Targetome Uncovers a lincRNA H19–miR-106a Interaction

J. Imig, A. Brunschweiler, A. Brümmer, B. Guennewig, N. Mittal, S. Kishore, P. Tsikrika, A. P. Gerber, M. Zavolan*, and J. Hall*, *Nat. Chem. Biol.* **2015**, *11*, 107. ETH Zürich and University of Basel

MiRNAs are short noncoding RNAs that regulate gene expression by interacting with target mRNAs. Identifying the interaction partners is essential for elucidating miRNA function. The groups of M. Zavolan and J. Hall have developed a method for this purpose that involves the use of pre-miRNAs modified with psoralen and biotin (*miR-CLIP*, microRNA crosslinking and immunoprecipitation) to capture their targets in cells termed, Applying this approach with pre-miR-106a resulted in the identification of hundreds of putative targets in HeLa cells, many carrying conserved sequences complementary to the miRNA seed but also many that were not predicted computationally. *miR-CLIP* provides a robust and potentially broadly applicable approach for use in conjunction with others to unveil regulators and components of noncoding RNA-containing networks.

